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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-036437
(43)Date of publication of application : 05.02.2002

(51)Int.Cl. B32B 27/00

(21)Application number : 2000-219963
(22)Date of filing : 21.07.2000

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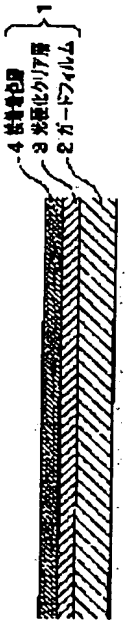
(54) OUTSIDE PLATE DECORATING FILM, ITS MANUFACTURING METHOD AND METHOD FOR USING THE SAME AS WELL AS DECORATING OUTSIDE PLATE, ITS MANUFACTURING METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an outside plate decorating film not suffering matting or blushing even by shaping a component to a complicated shape and a decorating outside plate using the decorating film.
SOLUTION: The outside plate decorating film 1 comprises a guard film 2 of a first layer, a photosetting clear layer 3 of a second layer, a laminated structure of an adhesive colored layer 4 of a third layer so that the clear layer is a semicured state. The decorating outside plate is obtained by shaping the film 1 to an outside plate to be decorated, and then emitting an ultraviolet ray to cure the layer 3.



LEGAL STATUS

[Date of request for examination]	26.04.2001
[Date of sending the examiner's decision of rejection]	16.07.2003
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	
[Date of registration]	
[Number of appeal against examiner's decision of rejection]	2003-15686
[Date of requesting appeal against examiner's decision of rejection]	13.08.2003
[Date of extinction of right]	

Japanese Publication for Unexamined Patent Application No. 36437/2002 (Tokukai 2002-36437)

A. Relevance of the above-identified Document

This document has relevance to all claims of the present application.

B. Translation of the Relevant Passages of the Document

[DETAILED DESCRIPTION OF THE INVENTION]

[0008]

[MEANS TO SOLVE THE PROBLEMS]

··· a guard film is employed instead of a backing sheet which is a conventional first layer. The invention is arranged so as to have a three-layer structure composed of a guard film as a first layer, a photo-curing clear layer as a second layer, and an adhesive layer as a third layer, the photo-curing clear layer being half hardened.

[0009]

Since the photo-curing clear layer is supple, the photo-curing clear layer is not locally elongated during shaping. This reduces defects such as loss of glossiness. Further, since the adhesive coloring layer is used for the pasting to the outer plate to be decorated, the guard film is no longer required after the shaping.

By appropriately selecting the material of the

adhesive coloring layer, it is possible to apply the outer plate decorating film to an outer plate made of various kinds of materials, such as iron plate, aluminum plate, and resin, for example.

[0011]

A manufacturing method of the outer plate decorating film is arranged so as to have the steps of forming the photo-curing clear layer on the guard film, and then forming the adhesive coloring layer on the photo-curing clear layer.

[0013]

A method for using the outer plate decorating film is arranged so as to have the steps of removing after the photo-curing clear layer is photo-cured and before the product is used, the guard film which protects the photo-curing clear layer from being damaged during the shaping.

[0014]

With the outer plate decorating film as described above, the outer plate is not damaged during a time after decorated and before the product is obtained and used by a customer. Further, by removing the guard film, it is possible to improve the color of the decorated outer plate.

[0015]

Further, an invention in accordance with claim 4 is

so arranged that the outer plate decorating film is shaped on an outer plate to be decorated, and then the outer plate decorating film is photo-cured, so that the decorated outer plate is arranged.

[0016]

Since the outer plate decorating film is shaped in supple state, it is possible to prevent the clear layer from losing its glossiness. In addition, by photo-curing the outer plate decorating film after the shaping, it is possible to obtain a decorated outer plate that has damage resistance enough to be used as an outer plate of an automobile, etc.

[0017]

A manufacturing method of a decorated outer plate is arranged so as to have the steps of photo-curing the photo-curing clear layer after shaping the outer plate decorating film on an outer plate to be decorated.

[0018]

Since the outer plate decorating film is shaped in supple state and then photo-cured, it is possible to obtain a decorated outer plate without causing the clear layer to lose its glossiness, etc.

[0021]

The adhesive coloring layer as recited in claims may have, not only a single solid color, but also metallic color,

[0022]

The half-hardened state of the photo-curing clear layer refers to a state before being cross-linked and can be further hardened by the irradiation of ultraviolet rays.

[EMBODIMENTS]

[0025]

A material of the photo-curing clear layer 3 may be a mixture of acryl polymer, acryl oligomer, and elastomer, for example.

The acryl oligomer is exited by the absorption of ultraviolet rays, and forms an acryl-based resin film through polymerization with acryl polymer.

[0027]

Next, the adhesive coloring layer 4 is coated to have a film thickness of 20 μm to 30 μm by a coating device 13 such as a roll coater and a knife coater at a discharge rate of 100 g/m^2.

[0031]

The outer plate decorating film 1 is pasted on the top force 21 by vacuum molding. Here, because the photo-curing clear layer 3 is half-hardened, the outer plate decorating film 1 can be easily transformed with respect to a deep-draw mold as shown in Figure 3(a), so as to be pasted on the top force 21.

[0033]

The ultraviolet ray irradiating device 26 irradiates ultraviolet rays to the resin part 25. This excites acryl oligomer as photo-sensitizer, and causes the acryl oligomer to be radical. Then, the radical and the monomer combines to start photopolymerization, and become pre-polymer. Repeating the combination of radical and monomer causes the polymer to grow until the polymerization ends when the acryl oligomer as the photo-sensitizer is recombined.

[0034]

After the photo-curing clear layer is hardened, the outer plate decorating film can be used as a product when the guard film 1 is removed.

[0038]

[EFFECTS OF THE INVENTION]

It is possible to provide an outer plate decorating film having improved coloring property without causing whitening and loss of glossiness even if used on a part having a complicated shape whose curvature is large.

[0039]

Further, by forming the photo-curing clear layer on the guard film, and then forming the adhesive coloring layer on the photo-curing clear layer, it is possible to manufacture an outer plate decorating film that has

improved coloring property and does not generate whitening and loss of glossiness.

[0040]

Further, by using the outer plate decorating film in such a manner that the guard film which protects the photo-curing clear layer from being damaged during the shaping is removed after the photo-curing clear layer is photo-cured and before the product is used, it is possible to prevent the outer plate from being damaged during a time after decorated and before the product is obtained and used by a customer. Further, it is also possible to improve the coloring property by removing the unnecessary layer.

[0041]

By using the outer plate decorating film to an outer plate to be decorated, it is possible to provide a decorated outer plate having improved coloring property without whitening and loss of glossiness.

[0042]

By photo-curing the photo-curing clear layer so as to obtain a coating film after shaping the outer plate decorating film on an outer plate to be decorated, it is possible to obtain a decorated outer plate having improved coloring property without causing whitening and loss of glossiness. Further, it is also possible to reduce

manufacturing cost because energy requirements in the manufacturing is low.